6. Establish the Requirements

Chapter 5 discussed creating a Mission Needs Statement (MNS), which quantified the warfighter's deficiency. In this chapter, we use the MNS to create the Operational Requirements Document (ORD), which quantifies the requirement. This chapter shows how to advance from the MNS to the ORD within the Partnership's military worth framework.

The process of advancing from the MNS to the ORD correlates with DoD 5000 Phase 0, Concept Exploration.

In particular, this chapter covers the following topics:

- Understanding the new process
- Understanding the key insights and redesign ideas
- The step-by-step process

6.1 Understanding the New Process

Figure 6-1. Establishing Requirements Process Flow. The purpose of concept exploration is to identify promising approaches that could meet the warfighter's needs and then set requirements for these approaches in the ORD.

6.1.1 Exploring Concepts That Address the Deficiency

The activities in this chapter mirror the activities that take place later in the acquisition.

In Chapter 5, we engaged in the pre–Milestone 0 activity of determining mission needs. The results of this analysis were summarized in the MNS. With the MNS, we achieved Milestone 0 and are now ready to move to Phase 0, Concept Exploration.

The purpose of concept exploration is to identify promising approaches that could meet the warfighter's needs. By using a draft Request for Information (RFI) and final Request for Proposal (RFP) process during concept exploration, the government gains

insight into industry's likely solutions and is better able to set the requirement in the ORD.

Note that the activities we perform in this chapter mirror the activities that take place later in the acquisition. This chapter discusses the following activities with respect to concept exploration:

- Convey the requirements.
- Select the source.
- Develop the solution.
- Evaluate the result.

These four activities will be discussed further in Chapters 7 through 10 with respect to developing an actual solution. In addition, these four activities are repeated in each of Phases I, II, and III of the acquisition.

Convey the Requirements

At this point of the acquisition, the government has identified and quantified the warfighter's deficiency in the MNS. Government communicates the warfighter's deficiency to industry in the form of an RFI, which contains the MNS and supporting information such as threat scenarios, mission runs from modeling programs, and access to the consolidated threat library.

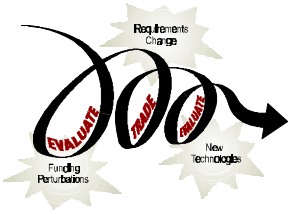
The detailed deficiency information in the MNS allows industry to see the warfighter's current capabilities versus specific threats in the scenario. Furthermore, the MNS shows industry what offset reduction would be required against each threat to allow the warfighter to complete the missions successfully.

With this information, industry responds to the RFI by describing its proposed solutions. The full set of industry's proposed solutions comprises a "solutions space." The RFI responses allow the government to see the whole range of possibilities and decide where it wants to concentrate within the solutions space.

Using the MNS and the responses to the RFI, government creates a draft RFP, which facilitates interchange between bidders and the government. For example, industry could ask government about what kinds of solutions it's looking for and what levels of cost, schedule, and risk it's expecting. Using the results of this interchange, the government creates the final RFP.

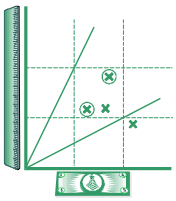
Select the Source

Industry responds to the final RFP with proposals for conducting concept exploration. Then, the government reviews the proposals and selects one or more contractors. Some of these contractors may never be directly involved in developing a solution (for example, laboratories and study houses).



Develop the Solution

During this stage, the selected Phase 0 contractors perform concept exploration to define potential solutions that address the deficiency. To define a potential solution, the contractor must characterize the cost, schedule, risk, and military worth of each solution. Typically, contractors will also conduct technology assessments or demonstrations during this phase. This information allows the government to evaluate the results of the concept exploration phase and set the requirement.



Evaluate the Results and Set the Requirement

The final step in establishing requirements begins with the government receiving the results of concept exploration from the Phase 0 bidders. Government consolidates the potential solutions and then performs an analysis of alternatives (AoA) to select the solution(s) it wants to develop.

At this point, the Electronic Warfare Center of Excellence for Analysis (EWCEA) is available to help conduct the analysis of alternatives, which compares the potential solutions in terms of their performance, cost, schedule, and risk. EWCEA is a "one-stop shopping center" for all tools and analyses used throughout the Partnership Process that are related to the Military Worth Method.

The requirement set under the Partnership Process is not a point requirement or a "golden" requirement.

Once the government has a sense for what solutions are feasible, it can set the requirement. However, the requirement set under the Partnership Process is not a point requirement or a "golden" requirement. Instead, the requirement refers to the range of capability between the threshold and objective, which is based in part on industry's projected capabilities as stated in their RFI responses and as assessed from the results of concept exploration analyses.

Finally, government formalizes the requirement in the ORD. Under the Partnership, the ORD is easier to write and get approved, since it is a higher-level document and is created using the rigorous Military Worth Method. The decision maker can be confident when

approving the ORD that the stated requirement will meet an acceptable level of warfighter needs.

6.2 Understanding the Key Insights and Redesign Ideas

Key Insights and Redesign Ideas

- Employ the EW Center of Excellence for Analysis (EWCEA).
- Shift early logistics planning to industry.
- Involve industry in foreign materiel exploitation (FME).
- Revise the ORD preparation and approval process.
- Develop a comprehensive plan for analysis.

6.2.1 Employ the Electronic Warfare Center of Excellence for Analysis

The EW Center of Excellence for Analysis (EWCEA) is the center of expertise for the complete array of studies that take place during an EW acquisition. EWCEA is a comprehensive resource that provides the information necessary to help EW acquisition personnel make informed decisions about acquisition issues.

EWCEA Performs Analyses Related to Military Worth

The predecessor of the AoA is the Cost and Operational Effectiveness Analysis (COEA).

Several analyses can be conducted during an acquisition that affect the system's development and determine whether it will be responsive to the warfighter's needs. These analyses include Concept Exploration and the Analysis of Alternatives (AoA).

In the past, these analyses were not conducted well (or at all) during EW acquisitions. One reason for this shortcoming is that good tools were not available. As a result, MNSs and ORDs, which are the outputs of such analyses and which formally convey EW requirements, failed to establish the links to military worth that are necessary to judge the effectiveness of EW systems.

Also, the warfighter was not directly involved in validating the military worth of the system as it was being developed. The credibility of such analyses has come under increasing scrutiny as competition for funding has increased.

Another reason that formal concept exploration was often omitted from EW acquisition is that solution technologies were already available. The Partnership advocates that all programs incorporate Phase 0.

For more information on the Military Worth Method and the Military Worth IPT, see Chapter 4.

In the near future, the EW Center of Excellence for Analysis will have the tools available to conduct concept exploration, AoA, and other analyses. These tools are part of the Military Worth Method identified by the Partnership's Military Worth IPT. The Military Worth Method, which quantifies an EW system's value to the warfighter, is the centerpiece of EWCEA's analytical process.

EWCEA Is a "One-Stop Shopping Center"

Our vision of EWCEA is a "one-stop shopping center" for all tools and analyses used throughout the Partnership Process that are related to the Military Worth Method. As such, EWCEA performs the following functions:

- Sponsors forums for obtaining warfighters' input on finding alternative solutions to their needs.
- Acts as a central point of contact for threat scenarios, threat data, and threat models.
- Uses the modeling and simulation toolset used by government and industry to determine requirements and evaluate solutions.
- Manages the modeling and simulation toolset according to AF/XOM guidance and policies.
- Oversees the analyses that establish the military worth of EW systems, including:
  - Deficiency analysis (MNS)
  - "Vertical" AoA (ORD)
  - Continuous AoA (product development)

See Section 6.3.6 for a definition of the "vertical" AoA.

- Provides contractual vehicles through which the user can obtain concept exploration results to use in developing ORDs.
- Conducts formal AoAs to help source selection boards find the most promising candidate solutions that address warfighter needs.
- Provides expert EW cost analysts who can build a database of projected and actual cost figures for EW systems.
- Provides a center of expertise that is capable of rapid response studies and analyses.

While EWCEA is the single point of contact, it relies on other organizations (including contractors) to provide data and perform analyses under its guidance. Details of EWCEA implementation will be developed through subsequent coordination.

EWCEA Provides Many Benefits to Acquisition Personnel

EWCEA provides acquisition personnel with a convenient clearinghouse for all information related to EW studies and analysis.

Some of the many benefits that EWCEA provides to acquisition personnel are:

- Ensures that performance and cost analyses are performed early in the acquisition when they will have the greatest impact.
- Institutionalizes several of the tenets of the Partnership Process, such as listening to the voice of the warfighter and using an analysis of alternatives to find the best solution.
- Establishes a central point of contact for relevant tools and databases.
- Provides acquisition personnel with a convenient clearinghouse for all information related to EW studies and analyses.

6.2.2 Shift Early Logistics Planning to Industry

Industry is best qualified to plan for logistics support when solutions are first being conceptualized. Contractors can begin logistics planning with the early reliability and maintainability models. As the models change and as the product design matures, they can update planning throughout the process. Better early planning could also decrease the need for interim contractor logistics support.

The Partnership Process envisions consistent logistics planning throughout the acquisition process. Logistics planning will be commensurate with the program phase.

The government's logistics role in all phases is gaining and providing insight to the industry partner. In this role of providing insight, the government will identify opportunities for logistics cost savings through the use of existing infrastructure. However, the government shouldn't dictate infrastructure if it would prevent industry from coming up with innovative solutions.

The benefits of shifting early logistics planning to industry are:

- Decreased government workload and cost
- Elimination of duplicate government/industry logistics planning efforts
- Better logistics coordination with the design and manufacture process
- Improved quality of early logistics tradeoffs

6.2.3 Involve Industry in Foreign Materiel Exploitation

Foreign materiel exploitation (FME) is the program for acquiring and studying enemy systems to determine how they work and how they can be defeated. During the Cold War, it was extremely difficult and expensive to acquire functioning enemy systems. Today, with the world less ideologically polarized and with weaponry proliferating around the globe, these systems are more readily available.

In the past, the government studied enemy systems in classified programs to determine the systems' susceptibilities and accessibilities. This information was tightly controlled and was made available to industry on a very limited basis, if at all.

In the future, the government will be more generous with its threat data.

In the future, the government will be more generous with its threat data. In keeping with the Partnership tenet that early and continuous partnering of all functional elements is critical, we will allow industry to participate in this stage of the process.

The mechanism for involving industry in FME is still undergoing definition. One idea involves having industry help subsidize the exploitation process and subsequent dissemination of data. Some legal issues remain regarding how to ensure access by all eligible contractors and how to collect fees. We envision that industry might even be present as the government studies the actual enemy systems in the field.

The benefits of involving industry in FME are:

Refer to the document "White Paper—DoD Dissemination of Foreign Materiel Exploitation Results Directly to Industry," approved by HQ USAF/TE(FMO), 10 July 1996.

- We can speed the development process, since threat data will be available to industry faster, with fewer bureaucratic entanglements.
- Industry will have all the threat data, not merely what would have been cleared for distribution in the past.
- Industry will have a deeper understanding of the military's problems. A greater insight into these problems will generate better solutions.

6.2.4 Revise the ORD Preparation and Approval Process

In keeping with the direction to work better, faster, and cheaper, the Partnership Process has revised the ORD preparation and approval process to significantly reduce the time needed to prepare, coordinate, and approve ORDs. This ORD process revision is a disciplined process based on "doing it right the first time."

Writing, Reviewing, and Approving the ORD

The Partnership recommends the following process for writing, reviewing, and approving the ORD:

1. A draft ORD is prepared by the Requirements Development Team (RDT). The RDT consists of the Integrated Concept Team (ICT) augmented by other user command representatives.
2. Before the first formal meeting of the RDT, a core group led by the action officer (AO) prepares a strawman ORD and sends it to all concerned parties (such as theater Commanders in Chief, program offices, test agencies, etc.). RDT members prepare their organization's positions and inputs.
3. The RDT meets formally to resolve members' inputs into the draft ORD.
4. Members and other stakeholder parties receive a copy of the strawman ORD and produce a formal draft ORD. The originating major command's (MAJCOM) requirements staff quality assurance office ensures that quality tenets are employed and ORD format/composition guidance is followed.
5. RDT members obtain ORD approval from executive levels at their home offices and reply to the AO.

6. The final ORD is prepared and mailed to all concerned parties after the originating MAJCOM commander approves it.

Ensuring the Quality of the Draft ORD

To reduce the time needed to review, comment on, coordinate, and approve an ORD, the RDT must create a quality draft ORD that requires little modification for final approval. A quality draft ORD depends on several factors:

- Comprehensive mission area analysis (MAA) and mission needs analysis (MNA).
- Existence of a MNS that quantifies the deficiency.
- An audit trail that traces data from the ORD back to the MNS.
- Enough concept exploration analysis to understand industry's possible solutions and to set meaningful thresholds and objectives.
- An ORD drafting team that, like the ICT, has good leadership, management, meeting facilitation, administrative logistics, and functional representation.
- Efficiently planned and executed ORD working sessions where the members arrive with their headquarters' input, members are empowered to act on their headquarters' behalf, the proceedings are focused and efficient, and the draft is finished in time to be taken home with the members.

For more information on the ICT, see Section 5.2.3.

Benefits of the Revised ORD Approval Process

The benefits of the Partnership's revised ORD approval process are that it:

- Puts comments and concerns before a forum (the ICT) for early resolution.
- Allows earlier participation of involved organizations, which results in organizational buy-in and a quality product.
- Encourages early dissemination of the information used in ORD development decision processes.
- Makes the results captured in ORDs available to industry earlier.
- Helps identify problems and the solution space earlier.

6.2.5 Develop a Comprehensive Plan for Analysis

The purpose of the Analysis Plan is to mature our understanding of solutions and solution spaces in terms of military worth.

The Partnership Process requires that the Single Acquisition Management Plan (SAMP) for every phase of a program include an Analysis Plan that lays out how the military worth process will be implemented. We anticipate that Analysis Plans will be very similar from program to program. The purpose of the Analysis Plan is to mature our understanding of solutions and solution spaces in terms of military worth. In other words, an important function of every program is to increase our understanding of the program's trade space.

The benefits of developing a comprehensive plan for analysis and including an analysis plan in the SAMP are that the analysis plan:

- Ensures that the required funding for proper analysis is identified.
- Promotes consistency across multiple initiatives (in other words, we don't have to start from scratch).
- Facilitates improved insight between government and industry of each other's roles and capabilities.
- Promotes development of the analytical underpinning necessary to successfully defend and execute programs.
- Helps in understanding the total program.
- Makes apparent the place and value of the Military Worth Method.
- Adds clarity to the role of analysis and how it aids the acquisition decision-making process.
- Enhances program confidence.

6.3 The Step-by-Step Process

In Chapter 5, we engaged in the pre-Milestone 0 activity of determining mission needs. The results of this analysis were summarized in a Mission Needs Statement (MNS). With the MNS, we achieved Milestone 0 and are now ready to move to Phase 0, Concept Exploration, the main output of the steps in this chapter.

6.3.1 Beginning with the MNS

At this point in the acquisition, the MNS also provides the impetus for the following activities:

- Guidance for science and technology (S&T) development
- Concept exploration for alternative concept classes
- Planning for test and evaluation infrastructure

Guidance for Science and Technology Development

The primary purpose of the MNS is to express an operational deficiency and to generate activities to address the deficiency.

Once the MNS is complete, it becomes a major source of guidance for government laboratory initiatives and for industry to conduct science and technology (S&T) development. These research activities are intended to provide the basic technologies that can become viable solutions.

For technology development to be successful, scientists and technologists must have a clear understanding of the warfighter's problem. This understanding should come from the quantified deficiency expressed in the MNS. By making the MNS available to the S&T establishment, we improve the linkage between warfighter needs and S&T activities.

Technology Master Plan and Technology Planning Integrated Product Teams. Another means to enhance guidance for research and development is through the Technology Master Plan (TMP) and the Technology Planning Integrated Product Teams (TPIPTs). The goal of the TMP is to plan, program, execute, transition, and transfer technology throughout the life cycle of Air Force systems. The TPIPTs help facilitate this process by providing development planning support for users in the form of roadmaps and investment recommendations for all Air Force mission areas (EW, Aerospace Control, Space, etc.). TPIPTs gather, organize, analyze, and disseminate information relating user requirements to technology development and transition for current and future systems as well as support infrastructure.

The Partnership Process supports the work of the TPIPTs and helps achieve the goal of the TMP by quantifying mission deficiencies and providing the context for assessment of proposed solutions, which frequently involve advanced technologies. When technology alternatives are identified that can potentially address the mission deficiencies in the MNS, they possess a greater chance for being funded to the point of being matured for incorporation into system designs. Additionally, their linkage to proposed solution concepts helps bound the trade space through the vertical AoA in the "establish requirements" activity area.

Concept Exploration for Alternative Concept Classes

We expect that the methods for performing concept exploration and establishing non-EW requirements will be very similar to the methods used for EW solutions.

While the focus of the Partnership Process is on EW acquisition, it's possible that some deficiencies identified by the Partnership Process could be addressed with non-EW classes of solutions. For example, more targets could be put at risk either by developing a better EW system or by employing a highly precise, long-range stand-off weapon.

This chapter shows how concept exploration is conducted for EW solutions. However, requirements for a non-EW concept could also be established at this point. We expect that the methods for performing concept exploration and establishing non-EW requirements will be very similar to the methods used for EW solutions.

Planning for Test and Evaluation Infrastructure

After we quantify the deficiency, we have information available to support test and evaluation planning. We know which threats are in the scenario, how the threats are employed, and which threats are the main causes of the deficiency. This information allows us to plan the facilities needed on ranges and in labs for eventual test and evaluation of the solutions developed to address the deficiency. It also allows us to foresee our needs for modeling and simulation tools.

6.3.2 Distributing the RFI

At this point of the acquisition, government has identified and quantified the warfighter's deficiency in the MNS. The next step is to find potential solutions that could address the deficiency. To do this, government must communicate the warfighter's deficiency to industry in the form of a Request for Information (RFI).

In this chapter, the term "RFI" refers to a document that explains the range of the warfighter's deficiency. The RFI is intended to solicit information from contractors before any contracts are awarded. The government does not expect that the eventual requirement will match the range of deficiency in the RFI, only that the requirement will be in the same space.

Figure 6-2 shows how the range of deficiency in the RFI will narrow to become the quantified requirement in the ORD.

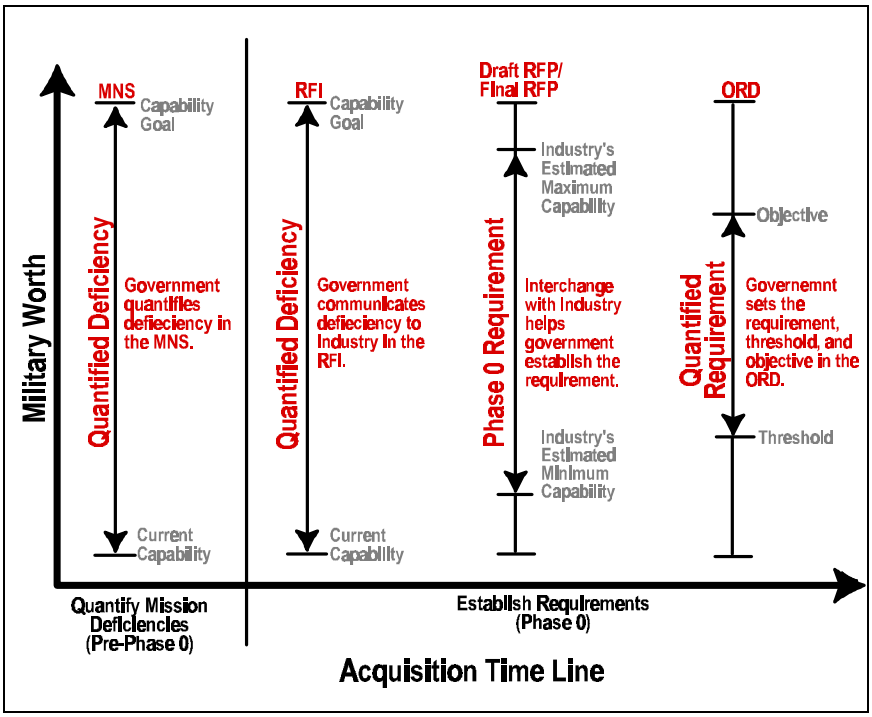


Figure 6-2. Narrowing the Deficiency. By using an RFI–draft RFP–final RFP process, we can narrow the quantified deficiency in the RFI into a quantified requirement in the ORD.

Contents of the RFI

In order to fully characterize the warfighter's deficiency to industry, the RFI contains the MNS along with the following information that supports the MNS:

For more information about the information that supports the MNS, see Chapter 5.

- Threat scenario(s) used to identify the deficiency
- Supporting threat models
- Procedures to gain access to the consolidated threat library
- Mission runs
- Modeling and simulation toolset (SUPPRESSOR, THUNDER, and ESAMS)
- Quick-turn analysis tool

The MNS distributed with the RFI also contains the following two tables, which provide more information on the threats the warfighter is facing and the current capability against those threats.

- Deficiencies by threat. This table lists the threats the warfighter is facing and the deficiencies in the warfighter's capabilities against these threats. A deficiency is characterized as the percentage of targets that cannot be put at risk due to a certain threat. See Figure 5-12 in Chapter 5.

For a detailed description of offset reduction, see Section 4.3.3.

- Offset reduction trade space. Figure 6-3 shows what offset reduction is needed per threat to achieve different levels of targets at risk (TAR). The term "offset reduction" describes how much closer an EW system allows an aircraft to get to the target while still maintaining an acceptable P_k (probability of kill). The purpose of this table is to show how different combinations of offset reduction will affect the final measure of targets at risk.

	Reduction in Low-Kill Offset (RiO) vs. Targets at Risk (TAR)											
Threat	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	←RiO
SA-X	20	20	30	35	45	55	70	85	95	100	100	
SA-Y	30	35	35	40	50	60	75	95	100	100	100	← TAR
AAA-A	60	60	65	65	70	80	90	100	100	100	100	(%)
All threats	20	25	30	45	50	70	70	85	100	100	100	

Figure 6-3. Offset Reduction Trade Space Table. This table shows the offset reduction necessary to achieve any capability goal up to 100% targets at risk.

For more information on how the offset reduction trade space table was derived, see Section 5.3.2.

Since government is providing all its data and models, industry will be able to trade capabilities at the level of individual threats. In other words, by having the models that the government used to determine the table in Figure 6-3, industry can see how trading offset reduction among individual threats will affect the final measure of targets at risk. Industry can focus on the threats it can mitigate with the highest effectiveness and least cost—and can still make sure that its solution provides an acceptable level of overall capability.

The Partnership's measure of military worth is the ability to accomplish ATO tasks (for example, putting targets at risk).

While industry may want to propose different solutions, the government might also want to explore solutions with different levels of capability. At this point in the Partnership Process, a single MNS could generate several ORDs that address different ranges in the requirements space, or the MNS could even generate ORDs for different concept classes (that is, non-EW solutions).

Receiving RFI Responses

When the government has characterized its deficiency, it sends the RFI to all interested contractors. Contractors are expected to use their own funding to respond to the RFI. The distribution of an RFI allows every potential bidder a chance to submit its ideas.

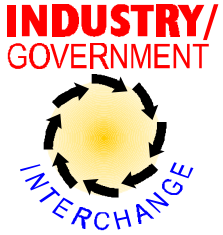
The government could receive only a few or perhaps dozens or even hundreds of RFI responses. Each response describes a solution that addresses the deficiencies stated in the MNS. The full set of industry's proposed solutions comprises a "solutions space." The RFI responses allow the government to conduct the first filter of potential concept exploration approaches.

For example, a deficiency could be addressed by updated software, a faster processor, new sensors, improved integration with other aircraft systems, or a completely new approach based on breakthrough technologies. The RFI responses allow the government to see the whole range of possibilities and decide where it wants to concentrate within the solutions space.

Protecting Proprietary Data

Many RFI and RFP responses will include proprietary data. The government is committed to protecting this information. The government can encourage industry to submit proprietary data because the data will be distributed only within the government or to non-competitive contractors. By carefully controlling contractors' proprietary data, the government will know what it owns when the acquisition moves from one phase to the next and will know what nonproprietary information can be shared with other contractors.

6.3.3 Conveying the Requirements



In this step, the government uses the MNS and the responses to the RFI to create the draft RFP. The draft RFP is used to facilitate interchange between bidders and the government. Using the results of this interchange, the government creates the final RFP.

Interchange Between Draft and Final RFP

Using the MNS and the responses to the RFI, government releases a draft RFP to solicit comments from industry. The government follows normal protocols for answering these comments.

Under the Partnership, industry can ask new kinds of questions about the draft RFP that couldn't have been asked when government was specifying the solution. In particular, industry can ask government how it came up with the deficiency and what types of solutions it's interested in.

For example, the draft RFP may state that the government is looking for a solution in the range of 30% to 80% targets at risk. A bidder might ask, "Why are you interested in only 80% targets at risk? We've got a breakthrough technology that can get you 100%. Or did you think that 100% would be too expensive?"

Using industry's responses to the draft RFP, the government can refine the final RFP to focus on the part of the deficiency space that industry believes it can address.

Contents of the Draft and Final RFPs

The draft and final RFPs convey key data to potential Phase 0 bidders, including:

- The quantified deficiency (the essence of the MNS)
- Supporting data from the MNS (scenario and threat data)
- Quick-turn analysis tool
- Cost and schedule constraints
- Criteria for evaluating Phase 0 proposals

Criteria for Evaluating Phase 0 Proposals

Bidders are judged both on their ability to conduct concept exploration and on their ability to carry concept exploration forward into later phases.

The criteria for evaluating Phase 0 proposals should explain to bidders that they will be judged both on their ability to conduct concept exploration and on their ability to carry concept exploration forward into later phases.

In addition, the Phase 0 RFP should ask contractors for their exit criteria for Phase 0. In other words, how much concept exploration does the contractor feel is necessary before Phase I can begin?

Creating Initial DSMs

A digital system model (DSM) is a software mockup of a contractor's solution that can be used to validate the military worth of the solution. The draft RFP in Phase 0 facilitates the interchange between government and industry before the final RFP is distributed. Contractors will develop initial DSMs for possible solutions after they have been awarded a Phase 0 contract.

In Phases I through III, however, the draft RFP will be used to "dry run" the DSMs that will be included as part of the proposals for these phases. In Chapters 7 and 8, we will see how DSMs are used in the proposals for later phases. Chapter 9 discusses how the DSM eventually becomes part of the contractual effort.

6.3.4 Selecting the Source

Industry responds to the RFP with proposals for conducting concept exploration. Then, the government reviews the proposals and selects one or more contractors to explore solutions that will address the deficiency.

Number and Type of Contractors

The purpose of concept exploration is to find promising solutions to address the warfighter's deficiency. In most cases, this work will be done by several contractors.

For some acquisitions, each contractor might be expected to examine the entire space defined by the deficiency, while in other acquisitions each contractor might examine a specific solution in detail. The government should determine the best concept exploration method based on the responses to the RFI. In any case, the work of all contractors together should address a significant part of the entire space defined by the deficiency in the RFP.

The Phase 0 contractors might include some contractors who are not actually developing a solution. For example, some Phase 0 contractors may be included in Phase 0 to check the DSMs of other contractors. Note that this second tier of contractors might not meet the criteria listed below for the main Phase 0 contractors.

Criteria for Selecting Phase 0 Contractors

Each Phase 0 bidder should be judged on its ability to conduct concept exploration and on its ability to carry concept exploration forward into later phases. The government should consider each bidder's ability to explore a range of potential solutions or a single solution, depending on what the acquisition requires.

The main "filters" the government should use to narrow the field of potential Phase 0 contractors are each contractor's:

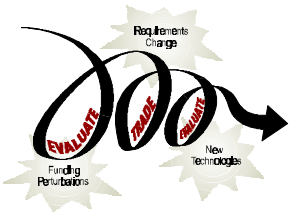
- Ability to create specific solution(s) (including knowledge of technologies, architectures, and existing solutions)
- Ability to understand the warfighter's deficiency

- Capability to perform concept exploration
- Specific plan for concept exploration
- Compliance with contractual constraints (for example, cost, schedule, and reporting standards)

Note that cost and schedule are constraints, not filters. Usually there is no hard line that signals the end of concept exploration and the beginning of system development. Also, cost isn't usually a competitive advantage, since the government has a fixed budget for concept exploration and usually intends to allocate all of it to one or more contractors.

After government has applied the preceding five filters to the field of potential Phase 0 contracts, it can award the Phase 0 contracts. Three contracts at this point would be typical.

6.3.5 Developing the Solution



In this stage, the selected Phase 0 contractors perform concept exploration by identifying promising concepts. The military worth of these concepts should fit within the range from the warfighter's current capability to the warfighter's capability goal. Contractors use a table like the one in Figure 6-3, which was distributed in the RFI, to determine where in this range they want their solution(s) to fall.

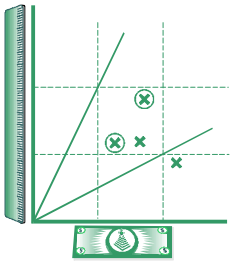
For more information on DSMs, see Section 8.2.3.

In some cases, the contractor will develop technologies that help show the feasibility of its preferred concept. More frequently, the contractor will create DSMs for several concepts.

The purpose of a contractor's Phase 0 work is to define a preferred solution that addresses the deficiency stated in the MNS. To define a preferred solution, the contractor must characterize the cost, schedule, risk, and military worth of each solution. This information allows the government to evaluate the results of the concept exploration phase and set the requirement.

In general, developing this information through Phase 0 contracts takes approximately 6 months.

6.3.6 Evaluating the Results and Setting the Requirement



The final step in establishing requirements begins with the government receiving the results of concept exploration from the Phase 0 bidders. The government consolidates the potential solutions and then performs an analysis of alternatives (AoA) to select the solution(s) it wants to develop.

Creating the Solutions Space

In response to the RFP, the Phase 0 bidders submit proposals for their potential solutions. For each solution, the bidder gives the overall military worth of the solution (in terms of targets at risk), along with the solution's cost, schedule, and risk.

The government consolidates all the potential solutions into a table (see Figure 6-4). This table represents a solutions space—a set of solutions with different levels of military worth, life cycle cost, schedule, and risk. There might be several contractors who could make each solution. The solutions space allows the government to see what level of military worth it can obtain, considering the constraints imposed by the other criteria.

Potential Solution	Contractor	Military Worth	Cost	Schedule	Risk
Radar Warning Receiver	FUD-Busters, Inc.	30% TAR	$0.3 M	2 years	Low
Jammer 1	Smucker's Jammer Co.	50% TAR	$1.0 M	2 years	Medium
Jammer 2	Jammin' Jammer Co.	75% TAR	$1.2 M	1 year	High
Decoy	Decoys 'R' Us	80% TAR	$0.9 M	3 years	Medium
Autonomous Loitering Anti-Radiation Missile (ALARM)	Missile Impossible, Inc.	100% TAR	$2.5 M	5 years	High

Figure 6-4. Potential Solutions Table. This table shows the military worth (in terms of targets at risk), life cycle cost, schedule, and risk of the potential solutions.

Performing a "Vertical" AoA

A "vertical" AoA compares each solution in the potential solutions table to the solutions above and below it.

Once the government has assembled all the potential solutions, it can perform an AoA to identify the solution that has the levels of military worth, cost, schedule, and risk that the government is willing to support.

The predecessor of the AoA is the Cost and Operational Effectiveness Analysis (COEA). A traditional COEA compared similar solutions in terms of their cost and performance. However, for the AoA in this step, the government is comparing dissimilar solutions in terms of several variables. Under the Partnership, this type of AoA is called a "vertical" AoA because each solution in the potential solutions table is compared to the solutions above and below it.

In the example in Figure 6-4, the ALARM has the highest military worth, but also has the highest cost, schedule, and risk. The decoy and jammer 2 are close on military worth, but one has less cost and risk while the other has a shorter schedule.

Figure 6-5 helps the government compare the five potential solutions. The graph shows the military worth and cost of each solution. By examining each solution's slope (the line connecting the zero point to the solution), we can evaluate each solution's value in terms of performance versus cost.

A steeper slope on the graph indicates a higher ratio of performance to cost. In addition to this graph, the government considers other information from the bidders' proposals, such as schedule, life-cycle cost, and detailed information about risk.

Figure 6-5, the radar warning receiver and the decoy have about the same slope. The two jammers also have about the same slope, but a lower slope than the radar warning receiver and decoy. Finally, the ALARM, though it has the highest military worth, has the lowest slope of any of the five solutions.

In addition to this graph, the government considers other information from the bidders' proposals, such as schedule, life-cycle cost, and detailed information about risk.

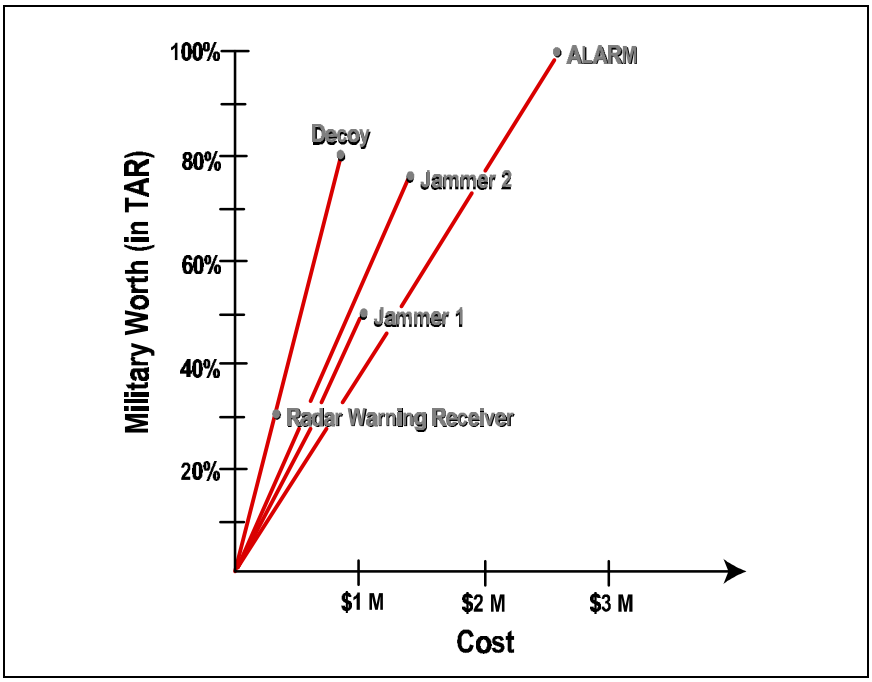


Figure 6-5. Vertical AoA. This graph plots the performance versus cost of five potential solutions. A steeper slope on the graph indicates a higher ratio of performance to cost.

In addition to the above graph, which compares only military worth and acquisition cost, the government considers other information from the bidders' proposals, such as schedule, life-cycle cost, and detailed information about risk.

The vertical AoA provides the means to evaluate these five alternatives and determine which solutions are feasible. The vertical AoA might also be the starting point for two separate programs, if the government decides that both alternatives are worth pursuing.

Note that the EWCEA is available to help the ICT conduct AoAs in this stage and throughout the acquisition cycle.

Setting the Requirement

The requirement set under the Partnership Process is not a point requirement or a "golden" requirement.

Once government has a sense of what solutions are feasible, it can set the requirement. However, the requirement set under the Partnership Process is not a point requirement or a "golden" requirement. Instead, the requirement refers to the range of capability between the threshold and objective.

Requirement, threshold, and objective are defined for our purposes as follows:

- Requirement: The range of capability between the threshold and the objective.
- Threshold: The minimum acceptable value for a parameter which, in the user's judgment, is necessary to provide a capability that will satisfy the mission need.
- Objective: A value beyond the threshold that could potentially have a measurable, beneficial impact on capability or operations and support above that provided by the threshold value.

These definitions are consistent with the definitions in DoD 5000. Refer to the following example from Chapter 5 to see how the threshold and objective might be set during an acquisition.

Example from Chapter 5. In the SWA 2010 scenario in Chapter 5, the F-19 aircraft is currently able to achieve only 20% of its targets. So any solution that achieves over 20% targets at risk would have some value to the warfighter.

In Figure 6-4, the potential solutions table, all five potential solutions have a capability of at least 20% targets at risk. These five solutions were plotted on the graph in Figure 6-5. By conducting a vertical AoA on these solutions, government compared the performance versus cost of each solution.

With this information, the decision makers at the user commands can see which solutions fit within their constraints for performance, cost, schedule, and risk. Figure 6-6 shows the five potential solutions along with the government's threshold and objective for cost and performance in this example.

The analyses conducted in this section do not represent a formula for source selection. Decision makers still have the authority to make such decisions; the analyses simply give them better information than what was available in the past.

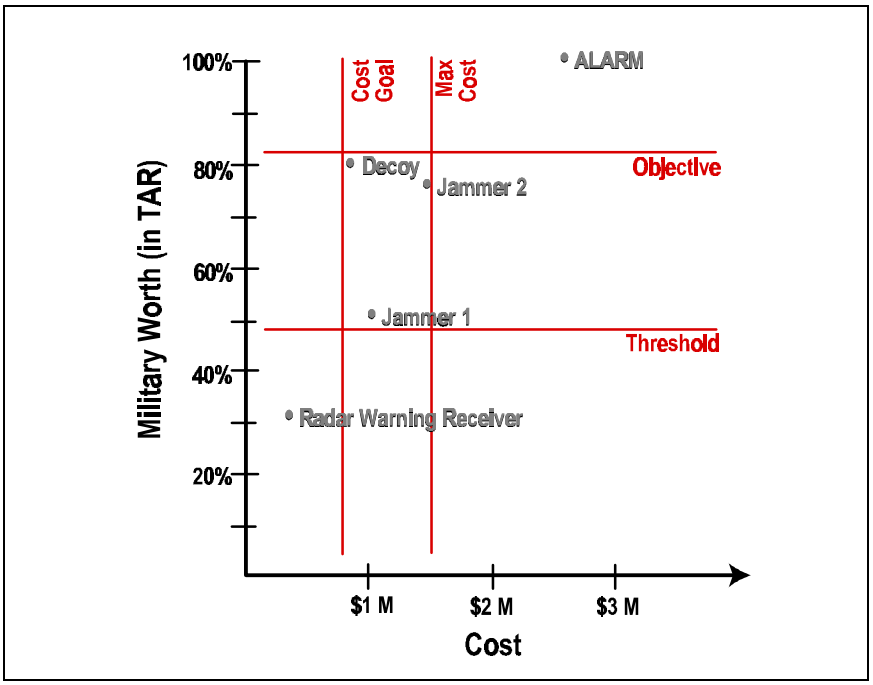


Figure 6-6. Vertical AoA with Threshold and Objective. Using information provided by Partnership tools such as the vertical AoA, decision makers can see which solutions fit within their constraints for performance, cost, schedule, and risk.

We began with a wide range of potential solutions, and have now narrowed our area of interest to a more realistic range based on competition between contractors. At this stage, even if a contractor falls outside our area of interest, it may be able to modify its solution (perhaps by reducing cost or performance) to fit within this area.

Note that 100% targets at risk was not set as the objective. While 100% can always be considered a goal, the formal objective could be set lower if industry's data show that 100% is unattainable, is too expensive, or would take too long to develop.

The warfighter, the decision maker, and industry all help set the requirement.

How industry helps set the requirement. The requirement is based on what level of performance the government thinks industry will be able to provide. This idea is different from the way many people think about requirements. When capability was measured by survivability, more capability was always better. But now that capability can be measured by targets at risk, we can determine what is an acceptable amount of capability to meet the warfighter's needs.

It may seem that industry is setting the requirement, since the requirement is based on what industry can achieve. This is partly true, but remember that we have already determined the warfighter's current capability. If industry can't achieve at least

20% targets at risk, then there is no reason to develop any of the solutions. It would be more accurate to say that the warfighter, the decision maker, and industry all help set the requirement.

And, in fact, industry has always influenced the government (particularly users) in this activity by identifying how potential solutions could address deficiencies. The difference is that the Partnership Process accomplishes this in a consistent, quantitative framework.

Advantages of a range requirement. The advantages of setting a range requirement instead of a point requirement are:

- The decision maker can make real decisions between a variety of potential solutions with different levels of anticipated military worth, cost, schedule, and risk.
- The decision maker knows that the solution will solve real problems, because the deficiency was determined using real threats in real scenarios.
- The decision maker has the full spectrum of the requirement characterized so that any performance achieved short of the desired level can still be considered as potentially worthwhile.

Writing the ORD

Once the requirement, threshold, and objective are set, they can be stated in the Operational Requirements Document (ORD). Under the Partnership, the ORD is easier to write and get approved, since it is a higher-level document and is created using the rigorous Military Worth Method.

The ORD is easier to write and approve. The new ORD has less detail than it did in the past. The ORD is no longer a specification-based document; the lowest measure of performance is now at the operational capability level. However, the ORD does contain a description of the operational context as well as the high-level requirements that will drive development and testing.

For more information on the revised ORD approval process, see Section 6.2.4.

Furthermore, the requirement in the ORD is now based on military worth and generated using a rigorous discipline. For these reasons, the requirement is more of an objective value and less a matter of opinion. The decision maker can be confident when approving the ORD that the stated requirement will meet the warfighter's needs.

This is the first time in the Partnership Process that government writes an ORD. In subsequent phases, the ORD will be updated.

The ORD includes threshold and objective. When the threshold and objective are stated in the ORD, they are stated in terms of both targets at risk and offset reduction.

Figure 6-7 shows how threshold and objective can be indicated in the offset reduction trade space table. The bounded area encompasses the offset reductions for each threat (the percentages in the header row) that will aggregate to levels of targets at risk from 50% to 80% (the numbers in the table rows).

Threat	Reduction in Low-Kill Offset (RiO) Versus Targets at Risk (TAR)											← RiO
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
SA-X	20	20	30	35	45	55	70	85	95	100	100	
SA-Y	30	35	35	40	50	60	75	95	100	100	100	← TAR
AAA-A	60	60	65	65	70	80	90	100	100	100	100	(%)

Figure 6-7. Offset Reduction Trade Space Table (with Threshold and Objective). After we perform a vertical AoA on the potential solutions, we can set a meaningful threshold and objective (in this example, 50% targets at risk and 80% targets at risk).

For information on deriving the offset reduction trade space table, see Section 4.4.4 and Section 5.3.2.

Understanding the offset reduction trade space table. The offset reduction trade space table in Figure 6-7 is very useful, but it can also be confusing because the table represents a large amount of data. One potentially confusing aspect is that the data in the table columns and the data in the column headings represent two different types of information:

- The column headings list the range of possible offset reductions that the solution could achieve (from 0% to 100%).
- The table columns show the resulting percentage of targets at risk for each offset reduction.

Summary

In this chapter, we advanced from the MNS to the ORD within the Partnership's military worth framework by narrowing the range of deficiency in the MNS to the quantified requirement in the ORD. In Chapter 7, we will see how the ORD is used to convey requirements to industry.